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Advancing Sustainability: A Comprehensive Review of Geospatial Technology in Monitoring Climate Change-driven Landslide Hazards

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Abstract

This comprehensive chapter delves into geospatial technology and its pivotal role in monitoring and managing climate change-driven landslide hazards while advancing sustainability. The chapter highlights the utilization of geospatial technology to analyze the effect of climate change on landslide occurrences. With precise measurements of ground movement, deformation, and slope stability enabled by this technology, it becomes possible to detect subtle changes preceding landslide events. Moreover, remote sensing, especially satellite imagery, provides invaluable insights into land cover changes, vegetation patterns, and erosion rates, facilitating the identification of landslide-prone regions and tracking temporal changes. Integrating geospatial technology data with climate models and other environmental information enhances our understanding of the intricate relationship between climate change and landslides. This knowledge serves as a foundation for informed decision-making processes related to land use planning, early warning systems development, and disaster risk

reduction, all of which contribute to mitigating the impacts of landslides in the face of a changing climate. Through geospatial technology, monitoring, assessment, and management of landslide hazards are improved, paving the way for formulating effective strategies that promote resilience and adaptation in vulnerable areas. This research critically evaluates the empirical and theoretical base underpinning the assertion that climate conditions trigger landslides. It also explores the role and applicability of geospatial technology in monitoring and studying global landslide events. By advancing sustainability and harnessing the potential of geospatial technology, this chapter aims to find the most suitable methods that contribute to the development of proactive measures in addressing climate change-driven landslide hazards. © 2025 selection and editorial matter, Dileep Kumar Gupta and Abhay Kumar Singh; individual chapters, the contributors.

Indexed keywords

Engineering controlled terms

Global warming; Risk management; Risk perception

Engineering uncontrolled terms

Erosion rates; Geospatial technology; Ground movement; Land-cover change; Landslide hazard; Landslide-prone regions; Measurements of; Precise measurements; Remote-sensing; Vegetation pattern

Engineering main heading

Landslides

Abstract

Indexed keywords

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Abstract

Climate change has bought unprecedented challenges to humanity. The world has witnessed the dark side of climate change in terms of rising sea level and increase in temperature of world. Low carbon emission is the key to minimize the impact of climate change. Widespread significance attached to reduction in carbon emission has given birth to the new notion of low carbon economy (LCE). The LCE suggests sustainable development of economy by minimizing the ecological damage through the adoption of green practices. The countries across the globe are aiming to become LCE. This paper provides insights into the new notion of low carbon economy and how India is moving towards the encouraging path to become low carbon economy to tackle impending climate change and balancing its developmental needs. © Published under licence by IOP Publishing Ltd.

Author keywords

Carbon emission; Climate change; Low carbon economy

Indexed keywords

Engineering controlled terms

Carbon; Energy conservation; Environmental management; Sea level; Sustainable development

Engineering uncontrolled terms

Carbon emissions; Ecological damage; Low carbon; Low carbon economy; Low-carbon emissions

Engineering main heading

Climate change

Abstract

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